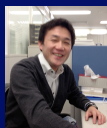


Efficient EUV sources by short CO₂ laser-produced plasmas: CO₂ laser system



Reiho Amano^{1,2}, Thanh Hung Dinh¹, Masato Kawasaki¹, Atsushi Sasanuma¹, Yuhei Suzuki¹, Goki Arai¹, Yukitoshi Otani¹, Takeshi Higashiguchi¹, and Taisuke Miura³

¹Utsunomiya University, ²ZEISS Japan, ³HiLASE Centre

Contact e-mail: higashi@cc.utsunomiya-u.ac.jp

Abstract

We develop the hybrid laser system with the sub-nanosecond laser and TEA CO₂ laser amplifier to produce the short pulse and high energy pulses at a wavelength of 10.6 μm . We will report the preliminary experimental results of the extreme ultraviolet sources from the short CO₂ laser-produced plasmas (LPPs).

Summary

We have demonstrated short pulse CO₂ laser with amplifier system at the repetition rate of 10 Hz in Utsunomiya University.

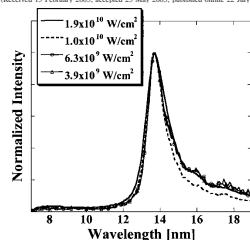
- (1) Pulse duration was variable from 3 to 20 ns with high energy pulse.
- (2) Beam quality was very good (M^2 does not measure yet.)
- (3) EUV emission would be expected with high conversion efficiency.

Background: CO₂ laser-produced UTA plasmas

Comparative study on emission characteristics of extreme ultraviolet radiation from CO₂ and Nd:YAG laser-produced tin plasmas

Hiroyuki Tanaka, Atsushi Matsumoto, Kouzi Akiraga, Akihiko Takahashi,¹ and Taisuke Miura
Department of Electrical and Electronic Systems Engineering, Graduate School of Information Science and Electrical Engineering, Kinki University, 6-401 Hakutsu, Fukuoka 812-8581, Japan

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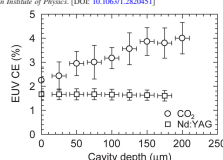


Enhancement of extreme ultraviolet emission from a CO₂ laser-produced Sn plasma using a cavity target

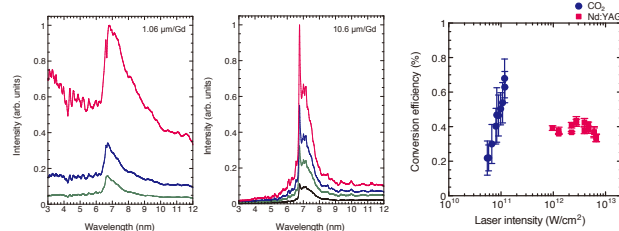
Yoshihumi Ueno,¹ Georg Soumagne, Akira Sumitani, and Akira Endo
EUV (Extreme Ultraviolet) Lithography System Development Association, 1200 Manda, Hiratsuka, Kanagawa 254-8567, Japan

Takeshi Higashiguchi²
Department of Energy and Environmental Science, Graduate School of Engineering, and Center for Optical Research and Education (CORE), Utsunomiya University, 330-8627, Utsunomiya, Japan 321-8585, Japan

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We demonstrated enhancement of in-band conversion efficiency (CE) at 13.5 nm of the extreme ultraviolet (EUV) emission from a tin (Sn) cavity target irradiated by a CO₂ laser pulse. Whereas a planar Sn target produced an in-band CE of around 2%, the use of cavity targets significantly enhanced the EUV emission energy and the EUV CE. An EUV CE of 4% was observed for a Sn cavity target with a depth of 200 μm which is one of the highest values ever reported. © 2007 American Institute of Physics. [DOI: 10.1063/1.2820451]

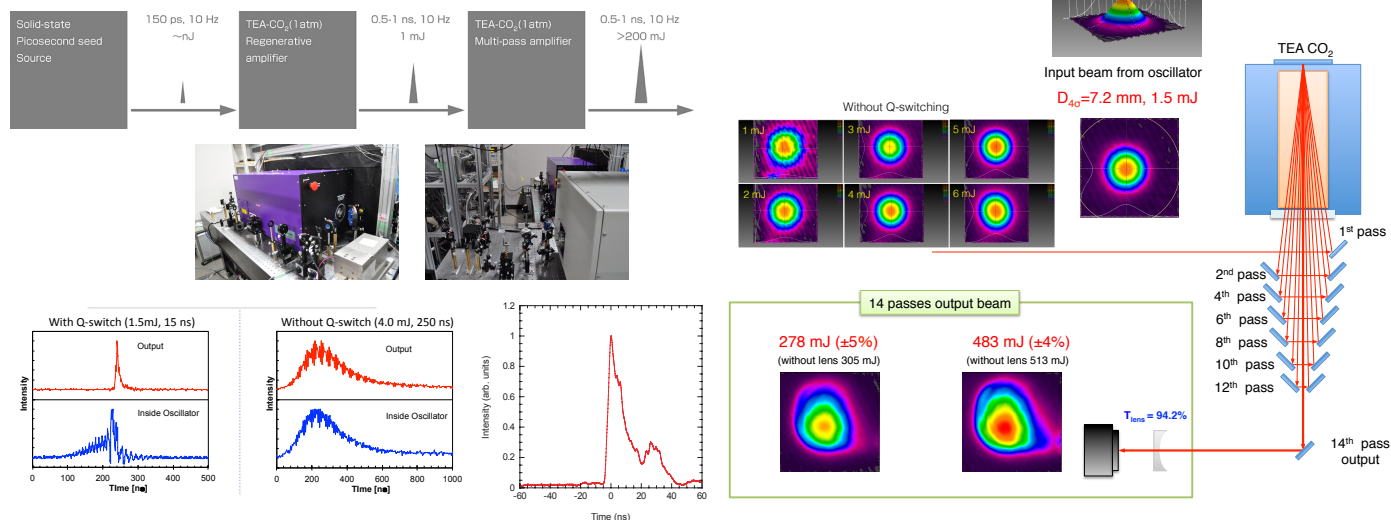


CO₂ laser-produced ₆₄Gd plasmas for 6.7 nm (beyond EUV)

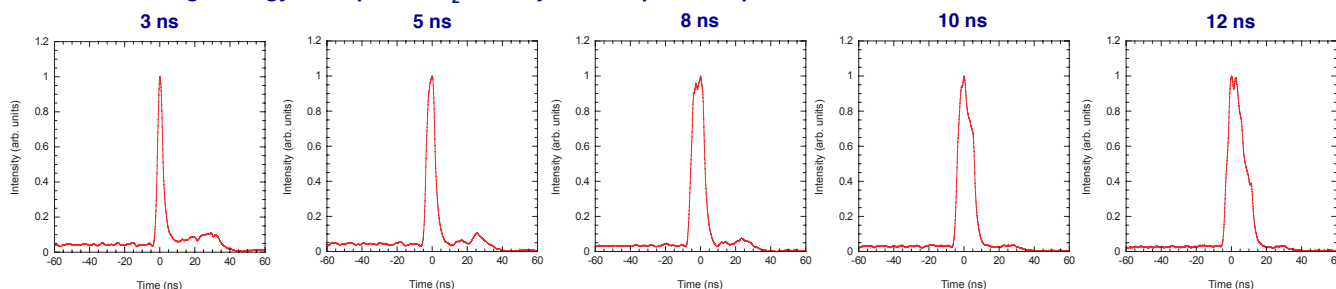


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Setup & Results



Generation of high-energy short pulse CO₂ laser by use of a pulse shaper



Characteristics of extreme ultraviolet emission from mid-infrared laser-produced rare-earth Gd plasmas

Takeshi Higashiguchi,^{1,*} Bowen Li,² Yuhei Suzuki,¹ Masato Kawasaki,¹ Hayato Ohashi,¹ Shuichi Torii,¹ Daisuke Nakamura,⁴ Akihiko Takahashi,⁵ Tatsuo Okada,⁴ Weihua Jiang,⁶ Taisuke Miura,⁷ Akira Endo,⁷ Padraig Dunne,⁷ Gerry O'Sullivan,⁷ and Tetsuya Makimura¹

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